REMARKS

Claims 55, 62 and 68 are amended. Claims 60 and 61 are canceled. Claims 51-53, 55-59 and 62-81 are pending in the application.

Claims 51, 53, 55-56, 58-62, 64-68, 73-81 stand rejected under 35 USC §102(e) as being anticipated by Gardner et al. Claims 52, 57, 63, 69, 70-72 stand rejected under 35 USC §103(a) as being unpatentable over Gardner et al.

The PTO and Federal Circuit provide that §102 anticipation requires that each and every element of the claimed invention be disclosed in a single prior art reference. *In re Spada*, 911 F.2d 705, 15 USPQ2d 1655 (Fed. Cir. 1990). The corollary of this rule is that the absence from a cited §102 reference of any claimed element negates the anticipation. *Kloster Speedsteel AB, et al. v. Crucible, Inc., et al.*, 793 F.2d 1565, 230 USPQ 81 (Fed. Cir. 1986).

Claim 51 recites providing fluorine within a gate oxide layer. Claim 51 further recites forming a gate proximate the gate oxide layer having the fluorine therein after the providing. Gardner teaches first providing a gate (203) on a substrate (col. 3, lines12-15), next providing a spacer layer (207) containing a fluorine bearing species (col. 3, lines. 18-22), and then annealing the substrate and spacer layer (207) (col. 3, lines 35-45) (see Figs. 2A-C and 3A-C). The Examiner suggests the Gardner teaching to annealing inherently provides fluorine within the gate oxide layer. Assuming the inherency argument is true, Gardner teaches providing the gate **before** providing the spacer layer and annealing, and therefore, the gate is provided **before** the fluorine is provided in the gate oxide layer. In

no fair interpretation could Gardner teach or suggest forming a gate proximate the gate oxide layer having the fluorine therein after providing the fluorine within the gate oxide layer as recited in claim 51. Since Gardner fails to teach a positively recited limitation of claim 51, claim 51 is allowable.

Claims 52-53 and 76-78 depend from independent claim 51, and therefore, are allowable for the reasons presented above regarding the independent claim, as well as for their own recited features which are not shown or taught by the art of record.

For example, claim 52 recites that fluorine is provided in a gate oxide layer to a concentration of from about 1 x 10^{19} atoms/cm^3 to about 1 x 10^{21} atoms/cm^3. The Examiner correctly states Gardner does not disclose a concentration of fluorine. However, the Examiner relies on an obviousness rejection stating the choice of obtaining such numerical limitation would have been well within the scope of one of ordinary skill in the art through routine optimization as a fine tuning process depending on the degree of suppression of hot carriers (Pg. 2 of Paper No. 20 referencing Paper No. 18, pg. 3). Applicant disagrees. MPEP §2144.03 states that while a rationale supporting an obviousness rejection may be based on common knowledge in the art or well known prior art, when a rejection is based on facts within the personal knowledge of the Examiner, the facts **must** be supported by an affidavit from the Examiner when called for by the Applicant. MPEP §2144.03 also references 37 CFR §1.104(d)(2) which states the same affidavit requirement. Since the facts presented herein regarding alleged teachings of limitations of claim 52 are not supported by any art, they necessarily are being presented

as facts within the knowledge of the Examiner. Accordingly, pursuant to the authority of MPEP §2144.03 and 37 CRF §1.104(d)(2), Applicant respectfully requests an affidavit supporting the facts alleged by the Examiner, or a reference teaching the limitations of claim 52. Claim 52 is allowable.

Claim 55 recites forming sidewall spacers proximate opposing edges of a gate and a gate oxide, the spacers being substantially devoid of fluorine. Gardner teaches forming a spacer layer 207 **containing** a fluorine bearing species (col. 3, lines 19-21; col. 4, lines 53-53). In no fair interpretation could Gardner teach or suggest the spacers being substantially devoid of fluorine as recited in claim 55. Since Gardner fails to teach a positively recited limitation of claim 55, claim 55 is allowable.

Claims 56-61 and 79 depend from independent claim 55, and therefore, are allowable for the reasons presented above regarding the independent claim, as well as for their own recited features which are not shown or taught by the art of record.

For example, claim 57 recites that a gate is formed to have a gate width between the edges of 0.25 micron or less and forming at least one concentration region in the gate oxide which extends laterally inward from the at least one gate edge no more than about 500 angstroms. The Examiner correctly states that Gardner does not disclose the gate width (pg. 3 of Paper 18 referenced by Paper No. 20 at pg. 2). Additionally, the Examiner correctly states that Gardner does not disclose the concentration depth referring to the 500 angstroms (pg. 3 of Paper 18 referenced by Paper No. 20 at pg. 2), and states that both limitations are well within the scope of one of ordinary skill. Applicant disagrees.

Accordingly, pursuant to the previous presented authority under MPEP §2144.03 and 37 CFR §1.104(d)(2), Applicant respectfully requests an affidavit verifying the facts alleged by the Examiner, or a reference teaching the limitations of claim 57.

Claim 59 recites that the concentrating comprises ion implanting. The concentrating refers to concentrating at least one of chlorine or fluorine in the gate oxide layer as recited in claim 55. Gardner is devoid of teaching or suggesting ion implanting at least one of chlorine or fluorine in the gate oxide layer, and an electronic search verifies the same. Consequently, in no fair interpretation could Gardner teach or suggest the concentrating comprises ion implanting as recited in claim 59. Since Gardner fails to teach a positively recited limitation of claim 59, claim 59 is allowable.

Claim 62 recites to a gate having opposing edges and a central region therebetween and forming sidewall spacers comprising at least one of chlorine or fluorine proximate the opposing edges and directly elevationally over the gate oxide layer. Gardner teaches forming a spacer layer 207 over a substrate 201 (col. 3, lines 19-21; Fig. 2B) and spacers 211 over the substrate 201 (Fig. 2D). Spacers 211 are directly over substrate 201 as shown in Fig. 2B. In no fair interpretation does Gardner teach or suggest forming sidewall spacers directly elevationally over the gate oxide layer as recited in claim 62. Since Gardner fails to teach a positively recited limitation of claim 62, claim 62 is allowable.

Claims 63-67 and 80 depend from independent claim 62, and therefore, are allowable for the reasons presented above regarding the independent claim, as well as for their own recited features which are not shown or taught by the art of record.

For example, claim 63 recites to a doping which provides a dopant concentration in the gate oxide layer proximate the edges from about 1 x 10^{19} atoms/cm^3 to about 1 x 10^{21} atoms/cm^3. Since Applicants disagree with the Examiner's reliance that such is well within the scope of ordinary skill in the art to suggest such limitation (pg. 2 of Paper No. 20 referring to Paper No. 18), Applicant respectfully requests an affidavit pursuant to the authority of MPEP §2144.03 and 37 CFR §1.104(d)(2), or a reference teaching the limitations of claim 63.

Claim 68 recites forming a gate over a gate oxide layer, the gate having opposing lateral edges and the gate oxide layer provided elevationally below the gate and extending laterally past the lateral edges of the gate. Gardner teaches a gate and gate oxide layer both having edges and substantially shown to be aligned (Figs. 2A-E and Figs. 3A-G). In no fair interpretation does Gardner teach or suggest the gate oxide layer provided elevationally below the gate and extending laterally past the lateral edges of the gate as recited in claim 68. Since Gardner fails to teach or suggest a positively recited limitation of claim 68, claim 68 is allowable.

Claims 69-75 and 81 depend from independent claim 68, and therefore, are allowable for the reasons presented above regarding the independent claim, as well as for their own recited features which are not shown or taught by the art of record.

For example, an obviousness rejection is presented against claims 69, 70 and 71 and the Examiner correctly states that the limitations recited in the respective claims are not taught (paper no. 20, pg. 2 referencing paper no. 18). However, the Examiner states

that such limitations are well known within the scope of one of ordinary skill. Applicant disagrees and respectfully requests an affidavit attesting to the alleged facts, or a reference teaching the limitations of claims 69, 70 and 71, pursuant to MPEP §2144.03 and 37 CFR §1.104(d)(2).

This application is now believed to be in immediate condition for allowance, and action to that end is respectfully requested. If the Examiner's next anticipated action is to be anything other than a Notice of Allowance, the undersigned respectfully requests a telephone interview prior to issuance of any such subsequent action.

Respectfully submitted,

Dated: 1-28-02

By: _____
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application Serial No. 09/292,132
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Inventor . . . . . Salman Akram
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Title: Methods of Forming a Transistor Gate

VERSION WITH MARKINGS TO SHOW CHANGES MADE ACCOMPANYING RESPONSE TO OCTOBER 26, 2001 FINAL OFFICE ACTION TO ACCOMPANY RCE FILING

In the Claims

The claims have been amended as follows. Underlines indicate insertions and ~~strikeouts~~ indicate deletions.

55. A method of forming a transistor gate comprising:

forming a gate and a gate oxide layer in overlapping relation, the gate having opposing edges and a center therebetween, the gate oxide layer having a center and outwardly exposed opposing edges laterally aligned with the edges of the gate; ~~and~~

concentrating at least one of chlorine or fluorine in the gate oxide layer having the outwardly exposed opposing edges and within the overlap more proximate at least one of the outwardly exposed oxide gate edges than the center; and

forming sidewall spacers proximate the opposing edges of the gate and the gate oxide, the spacers being substantially devoid of fluorine.

Please cancel claims 60 and 61.

62. A method of forming a transistor gate comprising:

forming a gate and a gate oxide layer in overlapping relation, the gate having opposing edges and a central region therebetween;

forming sidewall spacers comprising at least one of the chlorine or fluorine proximate the opposing edges and directly elevationally over the gate oxide layer; and

doping the gate oxide layer within the overlap with at least one of chlorine or fluorine proximate the opposing gate edges and leaving the central region substantially undoped with chlorine and fluorine.

68. A method of forming a transistor gate comprising the following sequential steps:

forming a gate over a gate oxide layer, the gate having opposing lateral edges and the gate oxide layer provided elevationally below the gate and extending laterally past the lateral edges of the gate;

forming sidewall spacers comprising at least one of chlorine or fluorine proximate the opposing lateral edges; and

diffusion doping at least one of chlorine or fluorine into the gate oxide layer beneath the gate from laterally outward of the gate edges.

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